Massachusetts
Toxics Use Reduction Program

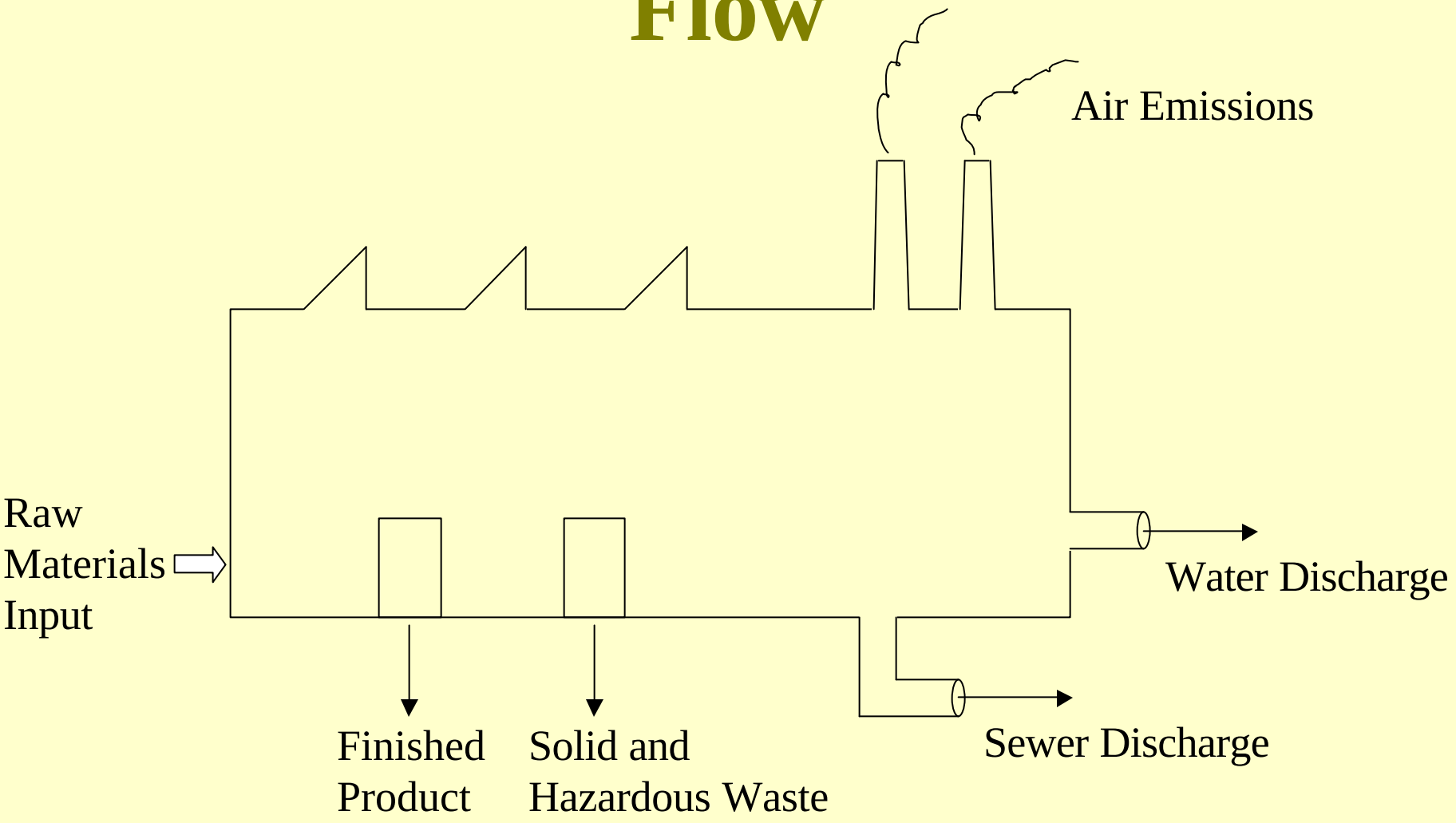
The Benefits of Toxics Use Reduction

September, 2004

Toxics Use Reduction

- Toxics Use Reduction is an idea developed during the 1980s by the environmental advocacy movement
- Toxics Use Reduction is a form of Pollution Prevention and Cleaner Production rather than Pollution Control
- Toxics Use Reduction focuses on reducing the use of toxic chemicals in industrial production and products

Industrial Facility Material Flow



Techniques of Toxics Use Reduction

- DIRECT
  - Chemical Input Substitution
  - Product Redesign
- INDIRECT
  - Process Modification
  - Operations and Maintenance Improvements
  - In-Process Recycling

Examples of Toxics Use Reduction

- Solvent substitution in washing and degreasing
- Cyanide replacement in electroplating baths
- Hydrocarbon-based inks replaced with water-based inks
- Dry-process coatings replacing wet-process coatings
- Installing energy- and water-conserving pumps and motors
- Installing automated pressure and temperature controls to reduce leaks and spills

Massachusetts Toxics Use Reduction (TURA)

- 1989—Massachusetts was the first state to enact a Toxics Use Reduction Law
- Goals of the Massachusetts Law
  - Achieve 50% reduction in byproduct (waste) by 1998
  - Establish toxics use reduction as the preferred means of compliance
  - Promote the competitive advantage of Massachusetts Industry
  - Reduce the production and use of toxic chemicals
- The program has focused on some 190 chemicals and involved over 1000 firms

Massachusetts Definition of Toxics Use Reduction

- Toxics use reduction means in-plant changes in production, processes or raw materials that reduce, avoid, or eliminate the use of toxic or hazardous substances or generation of hazardous by-products per unit of product so as to reduce risks to the health of workers, consumers, or the environment, without shifting the risks between workers, consumers, or parts of the environment.

  --Massachusetts Toxics Use Reduction Law

Industry Responsibilities under TURA

- Any firm manufacturing, processing or using any of 1200 toxic chemicals over a given threshold must:
  - report annually to the State on the amount of use and waste generated
  - prepare and biannually update a plan to reduce or eliminate the chemicals
  - pay an annual fee

State TURA Program Governance

- **TURA Administrative Council**
  - Sets broad program policy
- **Department of Environmental Protection**
  - Collects facility data
  - Collects fees
  - Establishes regulations
  - Provides for compliance and enforcement

State TURA Program Services

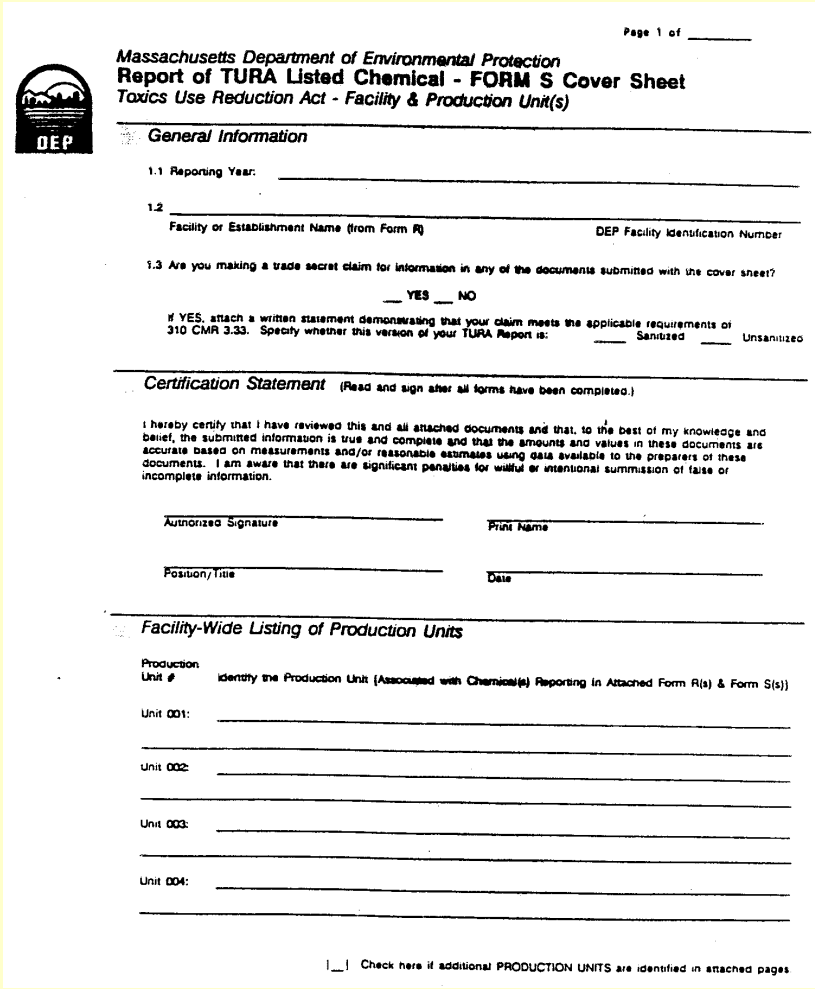
- **Office of Technical Assistance**
  - Provides financial and technical workshops
  - Provides facility specific compliance assistance
  - Provides on-site, confidential technical assistance
- **Toxics Use Reduction Institute** (University of Massachusetts Lowell)
  - Provides research, laboratory testing, and technology demonstration
  - Provides professional and public education and training
  - Provides community assistance grants

Annual TUR Reporting

- Annual reports by about 650 facilities
- Each facility reports on:
  - total toxic chemical use
  - total toxic byproduct (waste) generated
  - total toxic chemicals generated in or as products
  - economic activity index
- Data is installed on the Internet at

  www.turi.org/turadata

Massachusetts TURA Form"S"



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Massachusetts Department of Environmental Protection
Report of TURA Listed Chemical - FORM S Cover Sheet
Toxics Use Reduction Act - Facility & Production Unit(s)

General Information

1.1 Reporting Year: _____

1.2 _____
Facility or Establishment Name (from Form R) DEP Facility Identification Number

1.3 Are you making a trade secret claim for information in any of the documents submitted with the cover sheet?

___ YES ___ NO

If YES, attach a written statement demonstrating that your claim meets the applicable requirements of 310 CMR 3.33. Specify whether this version of your TURA Report is: ____ Sanitized ____ Unsanitized

Certification Statement (Read and sign after all forms have been completed.)

I hereby certify that I have reviewed this and all attached documents and that, to the best of my knowledge and belief, the submitted information is true and complete and that the amounts and values in these documents are accurate based on measurements and/or reasonable estimates using data available to the preparers of these documents. I am aware that there are significant penalties for willful or intentional summission of false or incomplete information.

_____ _____
Authorized Signature Print Name

_____ _____
Position/Title Date

Facility-Wide Listing of Production Units

Production Unit # Identify the Production Unit (Associated with Chemical(s) Reporting in Attached Form R(s) & Form S(s))

Unit 001: _____

_____

Unit 002: _____

_____

Unit 003: _____

_____

Unit 004: _____

_____

|_| Check here if additional PRODUCTION UNITS are identified in attached pages

Page _____ of _____

Massachusetts Department of Environmental Protection
Report of TURA Listed Chemical - FORM S
Toxics Use Reduction Act - Chemical Usage Facility-Wide & by Production Unit(s)

Facility-Wide Usage of Listed Chemical

1.1 _____
Chemical Identification (from Form R) CAS Number (if applicable)

1.2 Facility-Wide Usage of Chemical Identified in 1.1. Enter total amount (in POUNDS) for each applicable category.

1.2a Manufactured: _____ 1.2d Generated as Byproduct: _____

1.2b Processed: _____

1.2c Otherwise Used: _____ 1.2e Shipped in or as Product: _____

Year-to-Year Reporting Changes (Complete this section ONLY if applicable.)

2.1 If there has been a change from one reporting year to the current year in a (1) base year, (2) unit of product, and/or (3) estimating methods (that significantly alter previously reported data) for any of the PRODUCTION UNIT REPORT(s) completed below or attached. Specify (by number) the PRODUCTION UNIT(S) subject to such changed information:

_____

2.2 OPTIONAL QUESTION: Did anything non-routine occur at your facility during the reporting year which affected the data used to complete any of the PRODUCTION UNIT REPORT(s) shown below or attached?

____ YES ____ NO

If YES, you may use this space to comment: _____

TURA Report on Production Unit #: _____ (Enter # from FORM S Cover Sheet.)

3.1 Describe the Product Produced by this Production Unit: _____

_____

3.2 Enter Product SIC Code(s): |_|_|_|_| |_|_|_|_| |_|_|_|_| |_|_|_|_|

3.3 For this Production Unit, enter the following information:

3.3a Base Year: _____ 3.3c Byproduct Reduction Index: _____

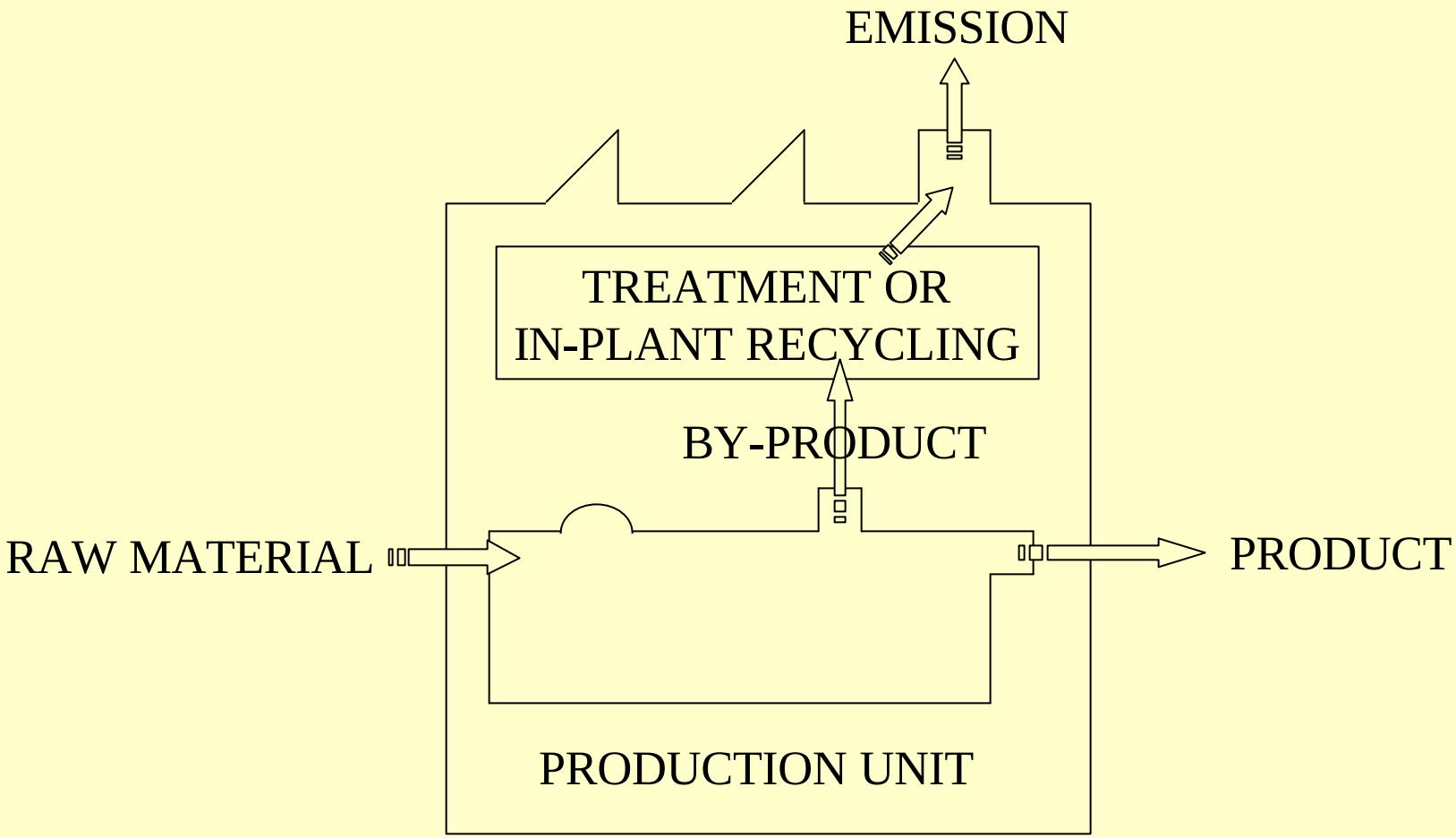
3.3b Quantity of Chemical Code: |_| 3.3d Emissions Reduction Index: _____

3.4 Toxics Use Reduction Techniques Code: |_|_| |_|_| |_|_| |_|_| |_|_| |_|_| |_|_|

DEP FACILITY I#: _____ REPORTING YEAR _____

|_| Check here if additional PRODUCTION UNITS are identified in attached pages

TUR Data Collection Points



Bi-Annual TUR Facility Planning

- First plans due in 1994
- Plans updated every two years
- Plans are kept on-site, but must be available for state inspection
- All plans must be certified by a licensed TUR Planner
- “Plan Summaries” are released to the public every other year

Elements of a TUR Facility Plan

- Facility Wide Statements
  - Management Policy on Toxics Use Reduction
  - Scope and Objectives of the Plan
- Production Unit Statements
  - Analysis of Current and Projected Toxics Use and Byproduct
  - Analysis of Economic Impacts
  - Evaluation of Potential TIM Techniques
  - Identification of TUR Techniques to be Implemented
  - Schedule for Implementation
  - 2 and 5 Year Byproduct Goals
- Plan Certification
  - Statement of Certification

Toxics Use Reduction Planners

- Number Trained by the Institute: 774
- Number Taking the State Exam: 550

- Total Number: 320

TURA Community Programs

- OTA Municipal Officials Training Programs
- OTA Healthy Schools Program
- TURI Clean Technology Demonstration Sites Program
- TURI TURN Grants Program
  - community organizations
  - municipal programs

Case 1: Tri-Star Technologies

- Tri-Star Technologies of Lowell produces printed wiring boards
- TUR planning identified the option of installing a electrolytic regeneration system to the cupric etch line, resulting in:
  - fully eliminating the use of hydrogen peroxide
  - a 90% reduction in the use of hydrochloric acid
  - recovery of 42,000 pounds of copper each year
  - a two-year pay-back of the $110,000 investment for the regeneration unit

Case 2: LePage Industries

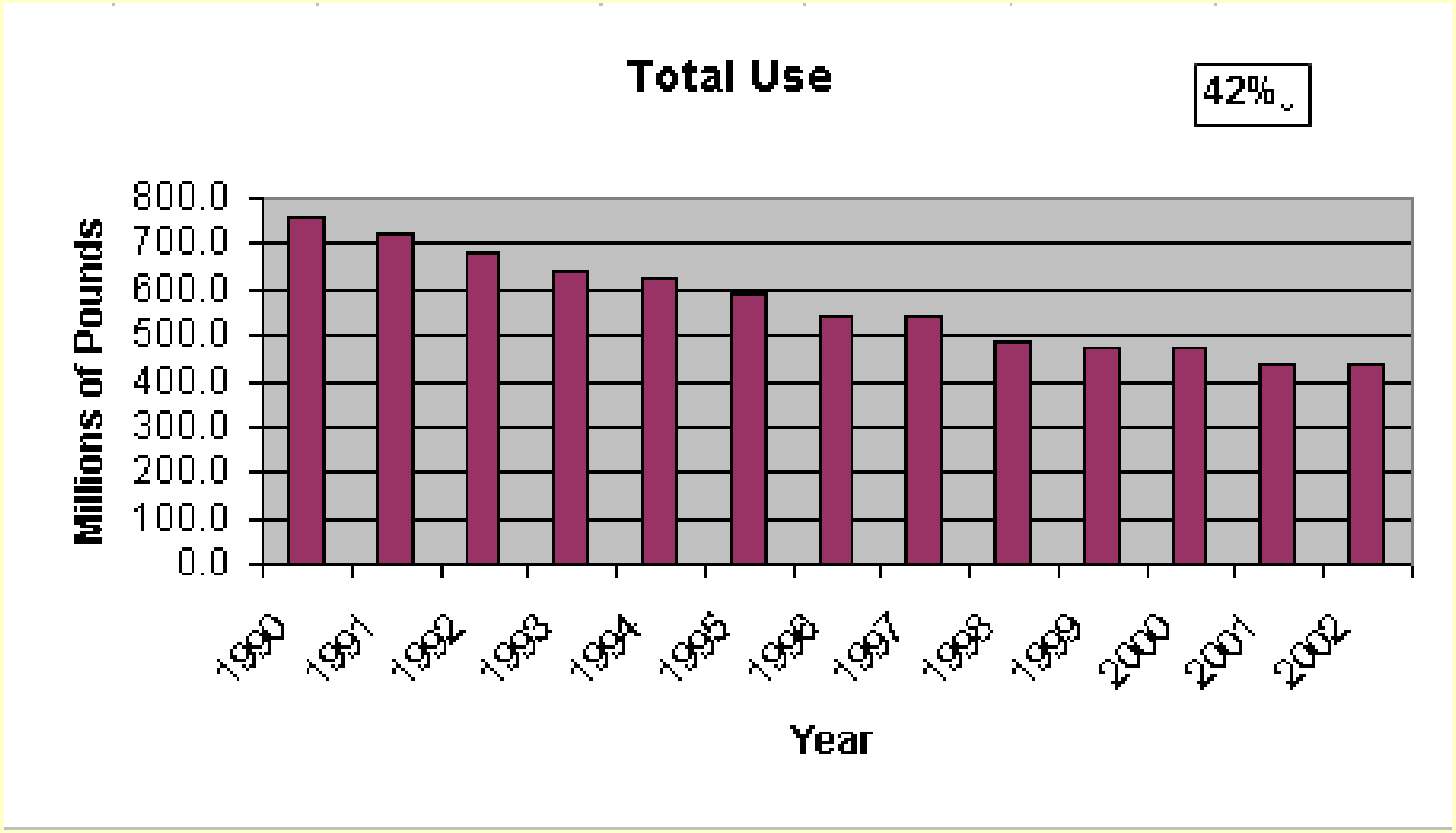
- LePage is a Gloucester-based manufacturer of adhesive tape.
- After performing hundreds of tests on solvents and adhesives, LePage:
  - totally eliminated the use of vinyl acetate and cyclohexane
  - reduced the use of toluene by 57% and ethyl acetate by 66%
  - significantly reduced workplace exposures to volatile compounds

Massachusetts Toxics Use Reduction Program Results, 1990 - 2002

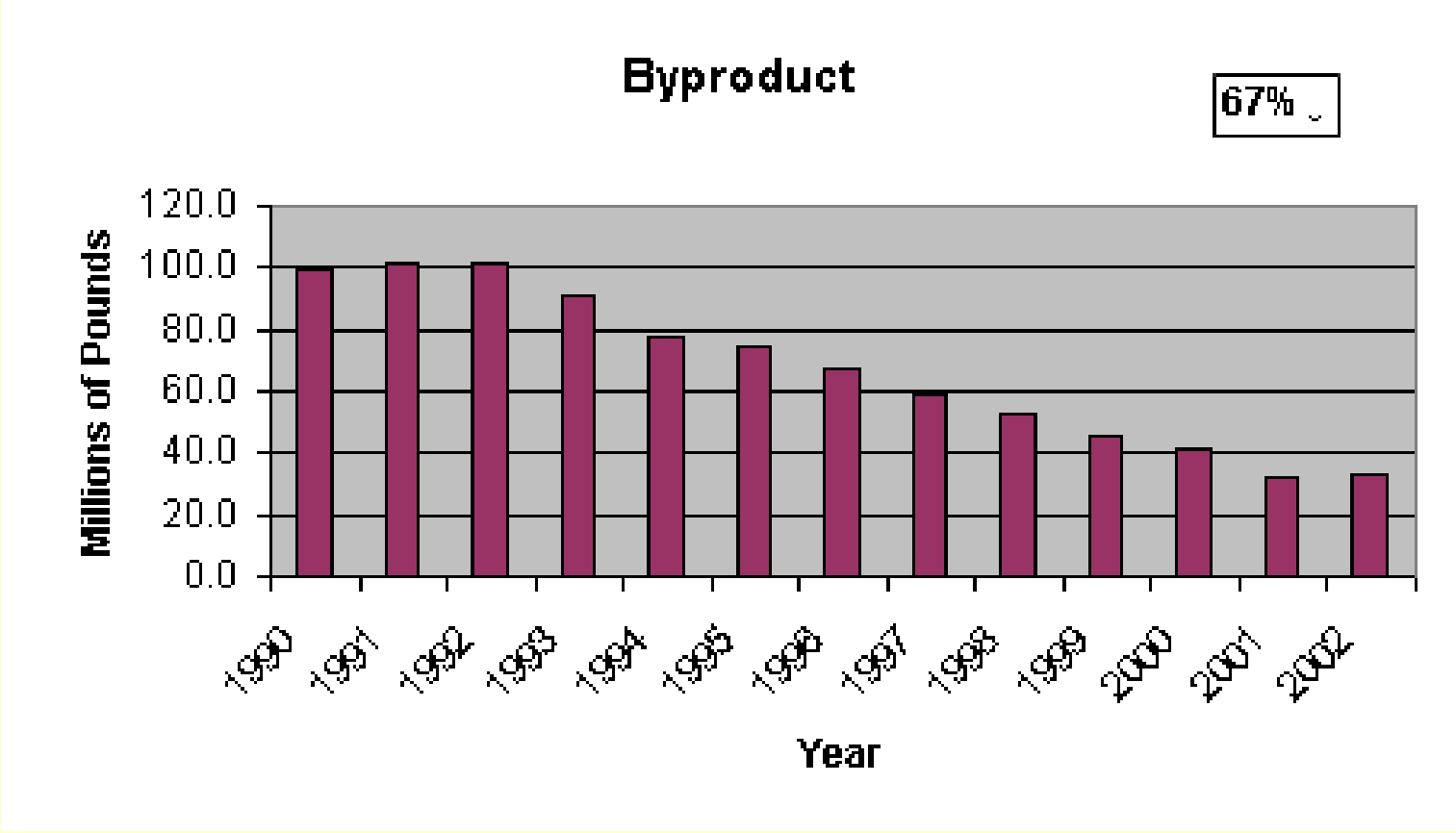
- Changes in Total Use, Byproduct Generation, and Environmental Release (Toxics Release Inventory) of Toxic and Hazardous Chemicals

	Total Use	Byproduct	On-site Releases to the Environment
Actual Quantity Change	13 % Reduction	40% Reduction	85% Reduction
Production-Adjusted Quantity Change	42% Reduction	61% Reduction	92% Reduction

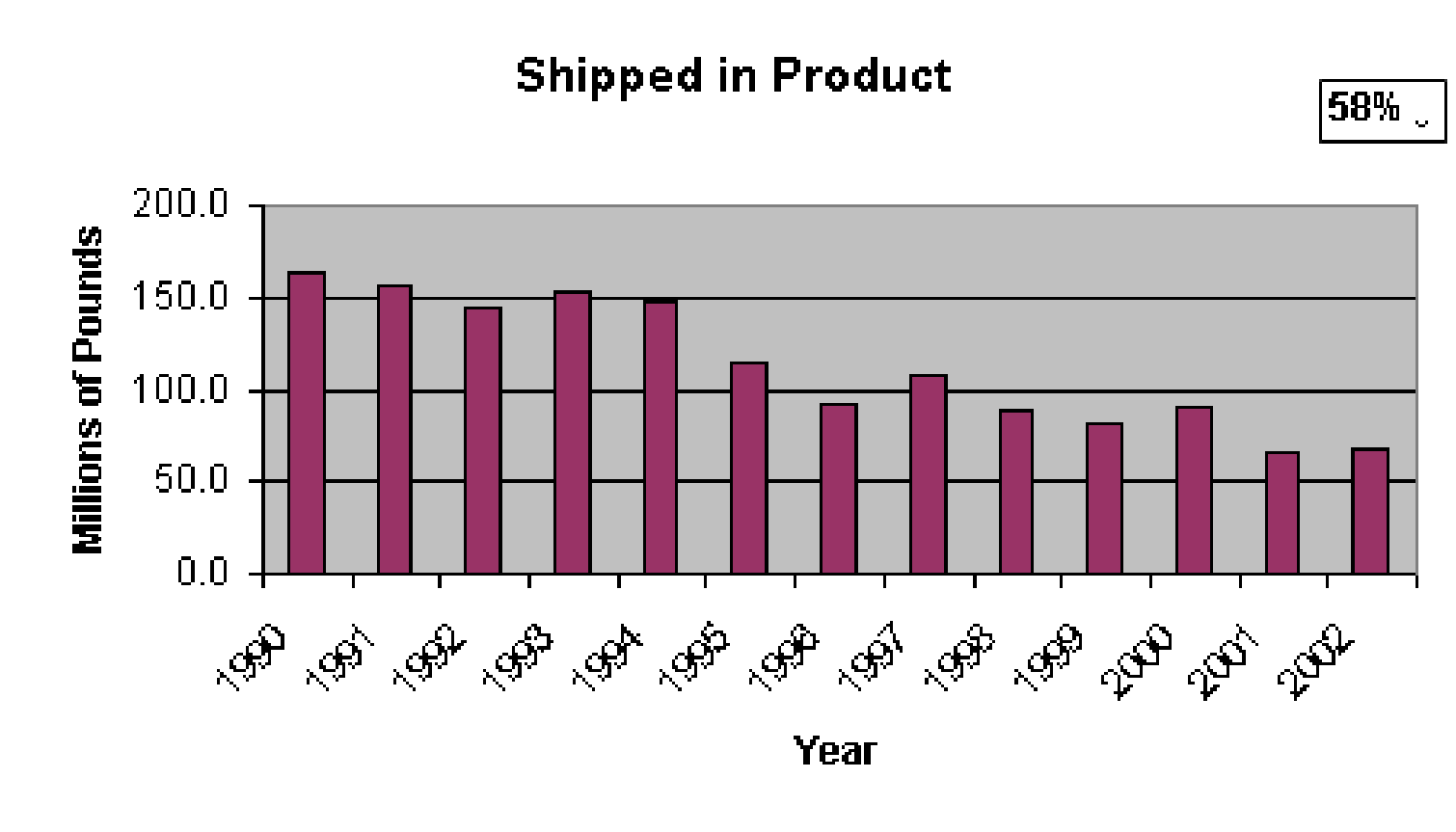
Trends in Toxic Chemical Use, 1990 -2002



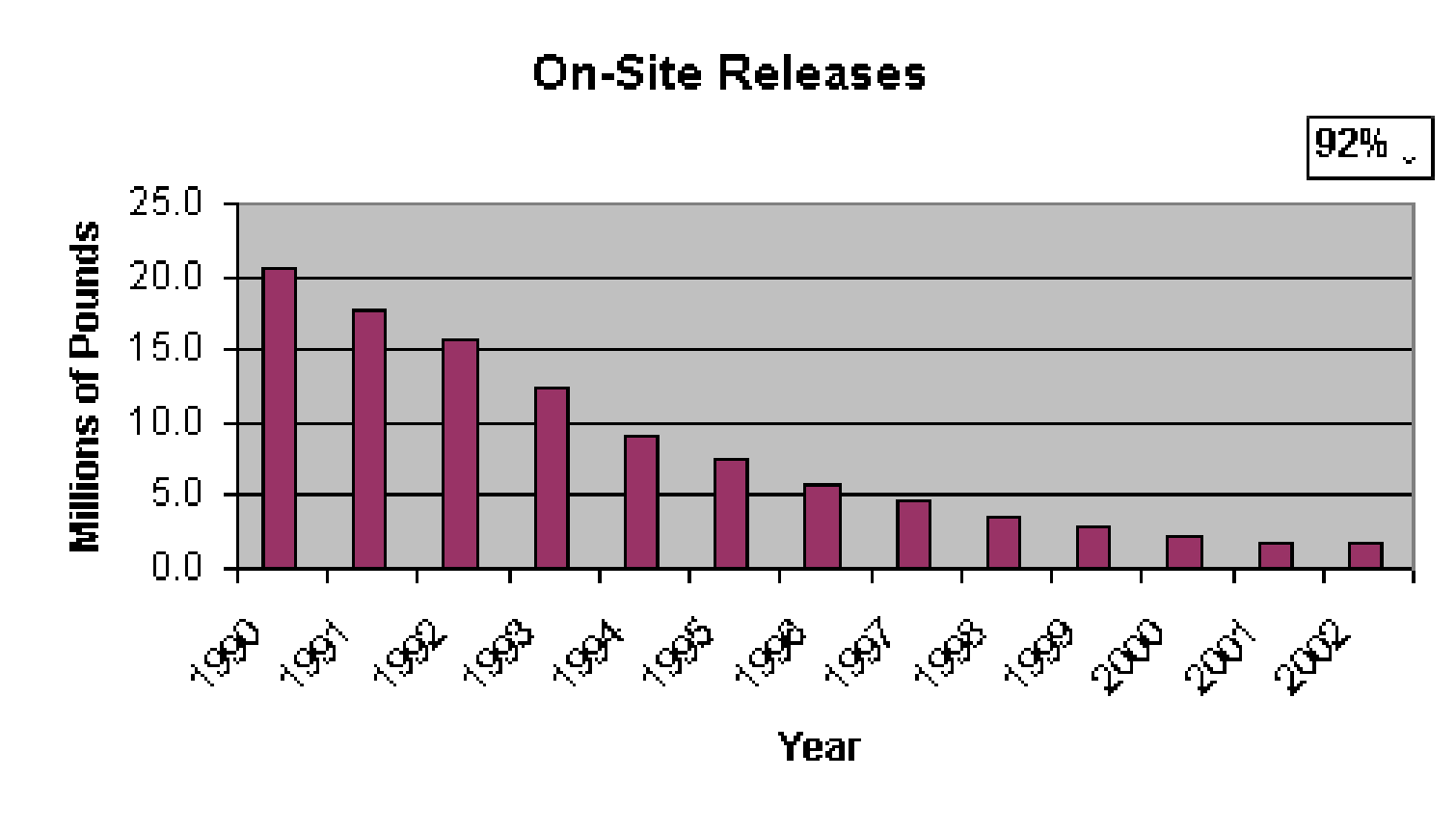
Trends in Toxic Byproduct (Wastes), 1990-2002



Trends in Toxic Chemicals Shipped in Products, 1990-2002



Trends in On-Site Releases of Toxic Chemicals, 1990-200



Toxics Use Reduction Program Evaluation

- Full Program Evaluation Completed in 1997
- Involved a Telephone Survey of 434 out of 645 TUR Filers
- Included an In-depth investigation of 25 TUR Filers
- Included a Benefit-Cost Analysis

Evaluating the TURA Program

- Planning:
  - 70% of firms identified TUR options in their plans
  - 81 % of theses reported implementing at least some parts of their TUR Plans
  - Of 21 firms in the In-Depth Investigation,11 reported that planning was a major TUR driver
  - Materials accounting was rated most valuable component of TUR planning

Evaluating the TURA Program

- TUR Implementation:
  - 67% of firms reported cost savings
  - 66% of firms reported health--and.safety benefits

The Costs and Benefits of the TURA Program

- Economic benefits exceeded costs

From 1990 - 1997:

- Costs = $77 million
- Monetized Benefits = $91 million

***Benefits do not include:

- human health and ecological benefits
- benefits to non-TURA firms
- other non-monetized benefits

Massachusetts is Safer and Cleaner

The Toxics Use Reduction Program demonstrates that industrial production and manufactured products in Massachusetts can be safer and cleaner as well as market competitive and economically viable.

Massachusetts can have a strong economy and a healthy environment.